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ABSTRACT

5 Contact structures exhibiting resilience or compliance for a
variety of electronic components are formed by bonding a free end
of a wire to a substrate, configuring the wire into a wire stem
having a springable shape, severing the wire stem, and overcoating
the wire stem with at least one layer of a material chosen
primarily for its structural (resiliency, compliance)
characteristics. A variety of techniques for configuring,
severing, and overcoating the wire stem are disclosed. In an
10 exemplary embodiment, a free end of a wire stem is bonded to a
contact area on a substrate, the wire stem is configured to have
a springable shape, the wire stem is severed to be free-standing
by an electrical discharge, and the free-standing wire stem is
overcoated by plating. A variety of materials for the wire stem
15 (which serves as a falsework) and for the overcoat (which serves
as a superstructure over the falsework) are disclosed. Various
techniques are described for mounting the contact structures to a
variety of electronic components (e.g., semiconductor wafers and
dies, semiconductor packages, interposers, interconnect substrates,
20 etc.), and various process sequences are described. The resilient
contact structures described herein are ideal for making a
"temporary" (probe) connections to an electronic component such as
a semiconductor die, for burn-in and functional testing. The self-
same resilient contact structures can be used for subsequent
25 permanent mounting of the electronic component, such as by
soldering to a printed circuit board (PCB). An irregular
topography can be created on or imparted to the tip of the contact
structure to enhance its ability to interconnect resiliently with
another electronic component. Among the numerous advantages of the
30 present invention is the great facility with which the tips of a
plurality of contact structures can be made to be coplanar with one
another. Other techniques and embodiments, such as wherein the
falsework wirestem protrudes beyond an end of the superstructure,
or is melted down, and wherein multiple free-standing resilient
35 contact structures can be fabricated from loops, are described.